



Dart Aerospace Ltd.
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4

D412-664-203TRN
Job Sheet 199405



Part No: D412-664-203TRN

Job Qty: 1 pcs

Part Name: Crosstube Turning Detail



Part Weight: 0 lbs

Status: New

Priority: Medium

Job Created: 8/22/19

Job Tracking No:

Due Date: 9/4/19

Created By: Marie Lajeunesse

Type: Stock

Description:

Note: D412-664-243 REV F IPP Rev:A 08-03-06 new issue DD verified by:eec IPP Rev B 08.04.02 Removed polish
EC verified by: DD

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Sign-off
					Setup Hrs	Run Hrs	Workcenter / Supplier	Lead Time	
100	Mori Selki TL-40 - 1	1 pcs	9/4/19	9/4/19	1.00	1.33	Mori Seiki TL-40 - 1		DAS 662019/09/25 9-89
110	QC 2	1 pcs	9/4/19	9/4/19	0.00	0.00	QC 2 - 1		
							QC 2 - 12		
							QC 2 - 14		
							QC 2 - 17		
							QC 2 - 19		
							QC 2 - 2		
							QC 2 - 20		
							QC 2 - 22		
							QC 2 - 23		
							QC 2 - 25		
							QC 2 - 32		
							QC 2 - 33		
							QC 2 - 35		
							QC 2 - 39		
							QC 2 - 4		
							QC 2 - 40		
							QC 2 - 44		
							QC 2 - 45		
							QC 2 - 48		
							QC 2 - 49		
							QC 2 - 50		
							QC 2 - 51		
							QC 2 - 52		
							QC 2 - 57		
							QC 2 - 62		
							QC 2 - 63		
							QC 2 - 8		
							QC 2 - 66		DAS 662019/09/25 9-89
							QC 2 - 64		

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8/22/2019

[Dart Hawkesbury] Job Sheet - Lajeunesse, Marie

					QC 2 - 65	
					QC 2 - 5	
					QC 2 - 71	
					QC 2 - 73	
					QC 2 - 69	DAS
120	Mori Seiki TL-40 - 2 - B4B	1 pcs	9/4/19	1.00 1.67	Mori Seiki TL-40 - 1 - B4B	662019/09/27
130	QC 2	1 pcs	9/4/19	0.00 0.00	QC 2 - 1	9-89
					QC 2 - 12	
					QC 2 - 14	
					QC 2 - 17	
					QC 2 - 19	
					QC 2 - 2	
					QC 2 - 20	
					QC 2 - 22	
					QC 2 - 23	
					QC 2 - 25	
					QC 2 - 32	
					QC 2 - 33	
					QC 2 - 35	
					QC 2 - 39	
					QC 2 - 4	
					QC 2 - 40	
					QC 2 - 44	
					QC 2 - 45	
					QC 2 - 48	
					QC 2 - 49	
					QC 2 - 50	
					QC 2 - 51	
					QC 2 - 52	
					QC 2 - 57	
					QC 2 - 62	
					QC 2 - 63	
					QC 2 - 8	DAS
					QC 2 - 66	662019/09/27
					QC 2 - 64	9-89
					QC 2 - 65	
					QC 2 - 5	
					QC 2 - 71	
					QC 2 - 73	
					QC 2 - 69	
140	QC 8	1 pcs	9/4/19	0.00 0.00	QC 8 - 12	
					QC 8 - 14	
					QC 8 - 17	
					QC 8 - 20	
					QC 8 - 25	
					QC 8 - 3	
					QC 8 - 32	
					QC 8 - 33	
					QC 8 - 35	
					QC 8 - 39	
					QC 8 - 4	
					QC 8 - 44	
					QC 8 - 45	
					QC 8 - 49	
					QC 8 - 58	
					QC 8 - 8	
					QC 8 - 9	
					QC 8 - 68	DAS
					QC 8 - 67	76
						9-89

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[Dart Hawkesbury] Job Sheet - Lajeunesse, Marie

					QC 8 - 1 (A)	
					QC 8 - 47	
					QC 8 - 40	
					QC 8 - 52	
					QC 8 - 23	
					QC 8 - 57	
					QC 8 - 1 (A)	
145 Crosstubes - 2 - B4B	1 pcs	9/4/19	0.00 0.25		Crosstubes - 1 - B4B	
					Crosstubes - 2 - B4B	
					Crosstubes - 3 - B4B	
					Crosstubes - 4 - B4B	
					Crosstubes - 1 - B4B	
150 Crosstubes - 3 - B4B HAND FINISH	1 pcs	9/4/19	0.00 0.92	HAND FINISH	Crosstubes - 2 - B4B	
					Crosstubes - 3 - B4B	
					Crosstubes - 4 - B4B	
					Crosstubes - 1 - B4B	
					Crosstubes - 2 - B4B	
160 QC 7	1 pcs	9/4/19	0.00 0.00		Crosstubes - 3 - B4B	
					Crosstubes - 4 - B4B	
					QC 7 - 10	
					QC 7 - 13	
					QC 7 - 14	
					QC 7 - 15	
					QC 7 - 17	
					QC 7 - 18	
					QC 7 - 19	
					QC 7 - 2	
					QC 7 - 28	
					QC 7 - 3	
					QC 7 - 30	
					QC 7 - 34	
					QC 7 - 36	
					QC 7 - 37	
					QC 7 - 41	
					QC 7 - 47	
					QC 7 - 48	
					QC 7 - 51	
					QC 7 - 58	
					QC 7 - 59	
					QC 7 - 60	
					QC 7 - 9	
					QC 7 - 68	
					QC 7 - 50	
					QC 7 - 67	
					QC 7 - 40	
					QC 7 - 24	
					QC 7 - 43	
					QC 7 - 61	
					QC 7 - 81	
170 Packaging 3-1 - Stock - B4B	1 pcs	9/4/19	0.00 0.00		Packaging 3 - 1 - B4B	
					Packaging 3 - 2 - B4B	
					Packaging 3 - 3 - B4B	
					Packaging 3 - 4 - B4B	
					Packaging 3 - 5 - B4B	
					Packaging 3 - 6 - B4B	
					Packaging 3 - 7 - B4B	
					Packaging 3 - 8 - B4B	
					Packaging 3 - 9 - B4B	
					Packaging 3 - 10 - B4B	
					Packaging 3 - 11 - B4B	
					Packaging 3 - 12 - B4B	
					Packaging 3 - 13 - B4B	
					Packaging 3 - 14 - B4B	
					Packaging 3 - 15 - B4B	

BB 9/30/2019

OCT 16 2019

DAS
76
9-89
2019-11-1

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					Packaging 3 - 16 - B4B	
					Packaging 3 - 17 - B4B	
					Packaging 3 - 18 - B4B	
					Packaging 3 - 19 - B4B	
					Packaging 3 - 20 - B4B	
					Packaging 3 - 21 - B4B	
					Packaging 3 - 22 - B4B	
					Packaging 3 - 23 - B4B	
					Packaging 3 - 24 - B4B	B3 2019-11-1
					Packaging 3 - 25 - B4B	
					Packaging 3 - 26 - B4B	
					Packaging 3 - 27 - B4B	
					Packaging 3 - 28 - B4B	
					Packaging 3 - 29 - B4B	
					Packaging 3 - 30 - B4B	
					Packaging 3 - 31 - B4B	
					Packaging 3 - 32 - B4B	
					Packaging 3 - 33 - B4B	
					Packaging 3 - 34 - B4B	
					Packaging 3 - 35 - B4B	
					Packaging 3 - 36 - B4B	
180 QC 21 - SA	1 pcs	9/4/19	0.00 0.00		QC 21 - SA - 21	21 NOV 01 2019
					QC 21 - SA - 70	
					QC 21 - SA - 53	

Part Op 100 - 1-Fill tube with sand & install plugs 412-203 on both ends as per Folio FA166 2-Face both sides of tube 3-Turn first
Descriptions: taper section on both side as per Folio FA166 4- blend transition lines using belt sander with 60 grit sandpaper
 110 - (QC2- Inspect parts off machine FAI/FAIB)
 120 - Mori Seiki TL-40 (Mori Seiki CNC Lathe Large) 1-Turn second taper on both sides as per Folio FA166 2- Blend transition lines using belt sander with 60 grit sandpaper. 3- Remove sand and plugs 4-Scribe part # and batch # using vibrating stilus
 130 - (QC2- Inspect parts off machine FAI/FAIB)
 140 - (QC8- Inspect parts - second check)
 145 - GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.
 150 - 1- handfinish X-TUBE INSIDE AND OUT
 160 - (QC7-Inspect Chemical Conversion Coat)
 170 - (Identify as per dwg & Stock Location: _____) LOCATION : LG014
 180 - (QC21- Final Inspection - Work Order Release)

Job BOM				
Part / Item	Component Name	Quantity	Operation	Container
D6009-129	Crosstube Material	1 pcs (1 ea)	100-Mori Seiki TL-40 - 1	F123972

Job Allocations				
Operation	Component Part	Required	Inventory	Allocated
100-Mori Seiki TL-40 - 1	D6009-129	1	80	0

Part Specifications				
Specifications could not be found.				



Container No: S217137



Part: D412-664-203TRN

Job No: 199405

Serial No/Batch: S217137

Revision: F

Inspector:

Exp Date:

Instructions:

Dart Aerospace Ltd.
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 CANADA
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 www.dartaero.com

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Date: 09/26/19

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DART AEROSPACE LTD	Work Order:	199405
Description: Crosstube Assembly (412 High Aft)	Part Number:	D412-664-243
Inspection Dwg: D412-664-243 Rev: F		Page 1 of 2

FIRST ARTICLE INSPECTION CHECKLIST

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.684	+0.005/-0.000	2.689	✓		CNC-04	
	2.748	+0.005/-0.000	2.753	✓		↓	
	2.884	+0.005/-0.000	2.889	✓		↓	
	3.019	+0.005/-0.000	3.024	✓		CNC-05	
	3.163	+0.005/-0.000	3.168	✓		↓	
	3.308	+0.005/-0.000	3.313	✓		↓	
	3.429	+0.005/-0.000	3.434	✓		↓	
	2.990	+0.005/-0.000	2.995	✓		CNC-04	
	2.618	+0.005/-0.000	2.623	✓		"	
	0.200	+/-0.010	.193	✓		CNC-08	
	R0.063	+/-0.010	.063	✓		RG	
	R0.500	+/-0.010	.500	✓		"	
	4.971	+/-0.030	4.975	✓		CNC-08	
SIDE B	2.684	+0.005/-0.000	2.688	✓		CNC-04	
	2.748	+0.005/-0.000	2.743	✓		↓	
	2.884	+0.005/-0.000	2.888	✓		↓	
	3.019	+0.005/-0.000	3.024	✓		CNC-05	
	3.163	+0.005/-0.000	3.168	✓		↓	
	3.308	+0.005/-0.000	3.313	✓		↓	
	3.429	+0.005/-0.000	3.434	✓		↓	
	2.990	+0.005/-0.000	2.994	✓		CNC-04	
	2.618	+0.005/-0.000	2.622	✓		"	
	0.200	+/-0.010	.200	✓		CNC-08	
	R0.063	+/-0.010	.063	✓		RG	
	R0.500	+/-0.010	.500	✓		"	
	4.971	+/-0.030	4.987	✓		CNC-08	
	124.100	+/-0.020	124.090	✓		Tape	

Item	Qty	Part Number	Description
1	-243		
1	X	D412-884-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	1	D8008-129	CROSSTUBE
3	2	D3895-083-970	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3188-1	CHAFING SHIELD
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	AIR	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD
10	AIR	PROSEAL 880 B-2	SEALANT

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6008-129
FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING)
 - 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C6-2, HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2
AFTER PAINTING, REMOVE MASKING AND APPLY MATTE CLEAR COAT
 - 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED.
 - 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
 - 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
 - 6) IDENTIFICATION: DART PIN "D412-884-243" AND BN ON INSIDE OF CLIFF PER QSI 044 8.4 (VIBRATING STYLUS)
 - 7) WEIGHT: 47.0 lbs
 - 8) PART IS SYMMETRIC ABOUT CENTERLINE
 - 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THIS TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLEND OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. DO NOT GRIND TUBE AFTER SHOT PEEN.
- TURNING
- 10) WHEN TRANSITIONING TO STOCK MAT'L, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- BENDING
- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7% (BASED ON O.D.) IN LOWER HALF OF R30 BEND AND 8% (BASED ON O.D.) ON REMAINING TUBE.

12) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038. TO BE PERFORMED AFTER FINAL POST-BEND GRINDING. ANY ADDITIONAL GRINDING REQUIRES ANOTHER LPI INSPECTION.

ASSEMBLY

13) INSTALL D2896-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015.

14) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3895-083-970 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP SIDE OF CROSSTUBE.

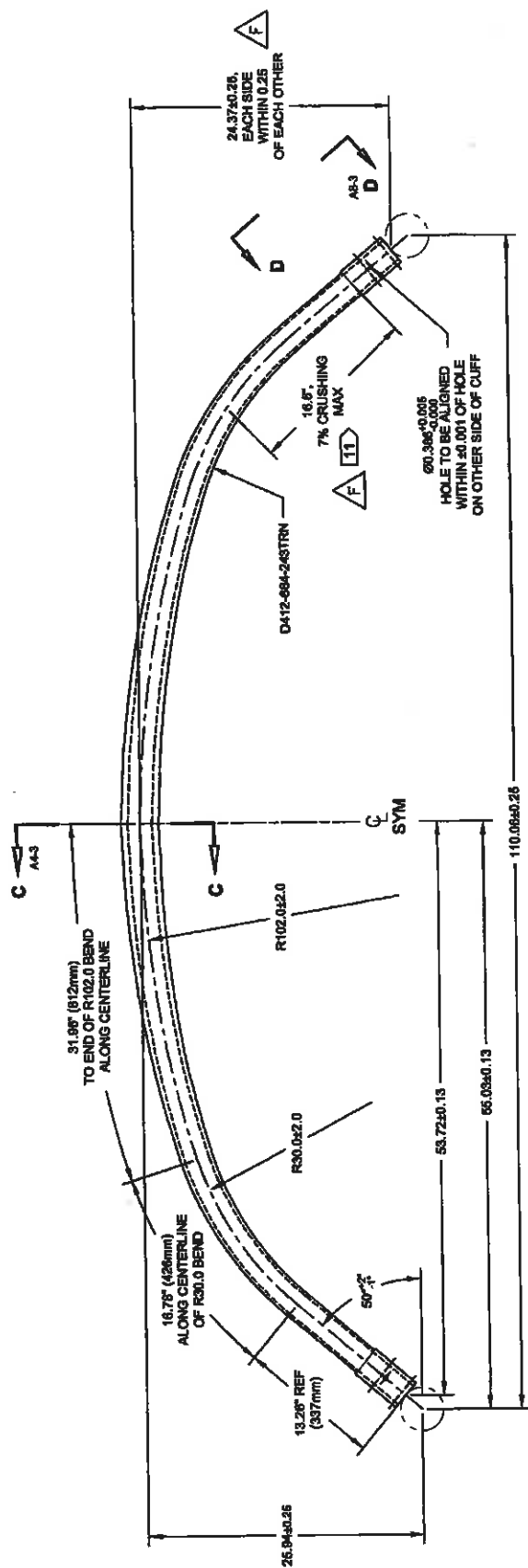
15) APPLY A THIN COAT OF PROSEAL 880 ON INSIDE CONCAVE SURFACE OF D3188-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEAL D3188-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 880 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

16) TORQUE CLAMPS ON D2896-1 SUPPORT 80 TO 100 IN-LB. TORQUE CLAMPS ON D3188-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVES HAVE CURED FOR 24 HOURS.

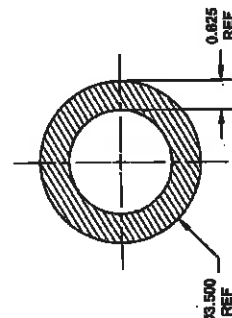
SHOOT COPY
RETURN TO
ENGINEERING
CONTROLLED COPY
OF AMENDMENT
NOTICE
ORDER
199405 MJS
19-08-22

RELEASED
2014-05-26

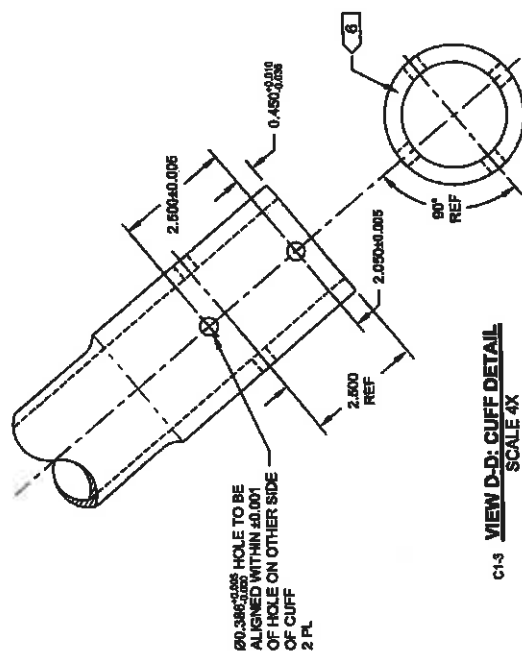
F	NOTES RE-ORDERED, SCOTCH-WELD WAS MAGNABOND (C6-1), ADD CLAMP RETORQUE (A8-1), CHAFING SHIELD NOW 4.38 INCHES (C6-2), ADD 7% CHAFING (B8-1), CHG BEND HEIGHT TOL TO ±0.26 (C4-1), CHG CLIFF TOL (D2-4), CLAMPS FLIPPED TO PREVENT CHAFING (B7-2, B7-3), INCORP. DED E2/4	CP	14.04.01
E	REFORMATRIZE GENERAL NOTES; REORGANIZED VIEWS AND REFORMATRIZED DRAWING TO CURRENT STANDARDS; RELOCATED FLAG #6 PER P44 (C6-3), ADD TOLERANCE (A8-1), C4-1, C4-3; MODIFIED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	08.08.30
D	REMOVE D2732-089, CHANGE TO D3895-083-970	PH	07.03.09
C	REMOVE D2896-800-1087, ADD D2732-088 & MAGNABOND 5398, MS21920-32 WAS MS21920-30	MB	08.10.27
B	ADD HOLES FOR COMPATIBILITY WITH B47/AA SHUTTLES	PH	06.02.04
A	NEW ISSUE	PH	01.10.17
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MPG, APPR	DW		
APPROVED			
DE APPR			
DATE	14.04.01		
DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA			
DRAWING NO. D412-884-243			
SHEET 1 OF 4			
TITLE CROSSTUBE ASSEMBLY (412 HI AFT)			
SCALE NTS			
COMPANY: DART AEROSPACE LTD 1100 DUNDAS STREET WEST, SUITE 200, HAWKESBURY, ONTARIO L0A 1H0, CANADA TEL: (905) 882-1100 FAX: (905) 882-1101			



D412-884-803
BENDING AND DRILLING DETAIL



SECTION C-C
SCALE 4X D-3



C1-3 **VIEW D-D: CUFF DETAIL**
 SCALE 4X

DESIGN	01	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA DRAWING NO. D412-864-243 REV. F SHEET 3 OF 4 TITLE CROSSTUBE ASSEMBLY (412 HI AFT) NTS SCALE COPYRIGHT © 2001 BY DART AEROSPACE LTD THIS DOCUMENT IS PROPERTY AND NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT PERMISSION IN WRITING FROM DART AEROSPACE LTD.
DRAWN	01	
CHECKED	01	
IMFG. APPR.	01	
APPROVED	01	
DE APPR.	01	
DATE	14.04.01	

RELEASED
2014-05-26



Entered: _____ Date: _____

WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

Route update only

NCR No. _____

Job: _____ Part No. _____		DISPOSITION ☐ Rework ☐ Scrap ☐ Use-as-is		DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Eng. (Non-AW) ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Engineering ☐ Water Jet ☐ Supplier ☐ Quality ☐	
Date: _____	Sequence #: _____	QTY Affected: _____		MRB (QSI042)	
Description Work Order Deviation		Disposition			
		Completed By			
		Lead hand / Supervisor			
		QC / QA Coordinator			
Root Cause ☐ Operator ☐ Manufacturing Process ☐ Equip/Tooling ☐ Handling/Preservation ☐ Material ☐ Product Improvement ☐ Process Improvement ☐ Human Factors		FAULT CATEGORY ☐ Contamination ☐ Misaligned/off center ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Incomplete/Unclear Instructions ☐ Drill Holes ☐ Fit/Function ☐ Pressure/Forced ☐ Bending ☐ Crushing ☐ Cracks ☐ Crimp/Kink/Ripple/Wave/Twist ☐ Marks/Chatter ☐ Mislabeled ☐ Other/Details: ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain Direction ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set/Set-up ☐ Positioned Wrong ☐ Outside Tolerance ☐ Drawing ☐ Finish ☐ Part Lost/Missing ☐ Misread			